

# PATENT SPECIFICATION

DRAWINGS ATTACHED

1,095,385



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COMPLETE SPECIFICATION

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## Water Heater

I, PESSUMAL TOLARAM, of R-106 434 Rosario Street, P.O. Box 3135 Manila, Philippines, a Citizen of India, do hereby declare the invention for which I pray that  
5 a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to water heating  
10 apparatus of the type commonly used in residential and commercial houses to provide a ready supply of hot water.

It is an object of the present invention to provide an improved water heating  
15 apparatus for this purpose which is relatively simple and inexpensive in construction.

Another object of this invention is to provide an improved instantaneous water  
20 heater in which the water to be heated serves as the resistance of the heater thus eliminating the use of expensive heating element.

The present invention consists in water  
25 heating apparatus which includes a container having a centrally located lower inlet and an upper outlet so that water can be caused to flow upwardly through the container from its inlet to its outlet, and  
30 a number of spaced parallel electrodes extending downwardly into the container so that when selected electrodes are connected to an electrical supply the water flowing between the selected electrodes  
35 serves as a load for the electrical circuit, thereby heating the water, wherein the electrodes are in the form of spaced parallel plates and the electrodes are secured together by means of a bolt passing  
40 horizontally through the electrodes and being electrically insulated from all of them.

In the accompanying drawings:—

[Price 4s. 6d.]

Figure 1 is a side view of apparatus according to the present invention: 45

Figure 2 is a side view of the apparatus with its casing removed showing the arrangement of electrodes and insulators, and

Figure 3 is a perspective view of the 50 portion shown in Figure 2 of the apparatus.

In carrying the invention into effect according to one convenient mode by way of example, Figure 1 of the drawing shows water heating apparatus in which 3 55 represents a cylindrical casing of at least 1/4 inch thickness and having a chamber which can hold say one half pint of water in addition to electrodes or plates that are to be housed inside. 60

This casing 3 is provided with a water inlet 1 and a water outlet 2, arranged at right angles to each other. The inlet is threaded for connection with a source of water to be heated and likewise the outlet 65 may also be threaded for connection with a pipe whereby the heated water may be dispensed where desired. Casing 3 is provided with cover 5 for terminal lugs 9a, 9b and 9c. This cover 5 has a tube 8 70 protruding from its side which serves as an entrance for electrical wires to be connected to an electrical system. The end of this tube 8 is threaded for a nut having an insulator to hold in place the electrical wires. Cover 5 is mounted over the casing 3 by means of nut 7 on a bolt (not shown) which passes through a bolt hole 19 at the centre of a circular gasket 10, as shown in Figure 3 of the drawing. Gasket 10 is 75 made up of strong insulating material so as to prevent leakage of water from the casing and at the same time holds the three terminal lugs 9a, 9b and 9c, as shown in Figure 3. Tightness of this gasket 10 85 is ensured by the use of a metal nut 4

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ERRATUM

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Page 2, Line 10<sup>3</sup> for "electrole" read "electrode"

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whose internal thread fits exactly the thread around the mouth of the casing 3.

Figure 2 of the drawing shows electrodes in the form of steel plates 15a, 15b, 15c, 15d, 15e and 15f, spaced apart by insulators 16. These plates are held together at their biggest portions by a bolt 17, with the insulators 16 preventing mechanical contact of the plates with said bolt 17, and tightened by nut 18 in order to form a rigid structure.

To avoid mechanical contact with the internal surface of the casing 3, the plates are rigidly suspended under gasket 10 by means of hexagonal bars 11a, 11b and 11c, connectors 12a, 12b and 12c, screws 14a, 14b and 14c, and three nuts mounted on the top of gasket 10 and tightened to terminal lugs 9a, 9b and 9c. Each terminal lug with its corresponding hexagonal bar is made up of one piece of material similar to hexagon-head bolt but having a longer head with socket at the end portion and threaded hole at its side to accommodate a portion of the connector and screw, respectively. With this arrangement, it is apparent that connector 12a is well secured to hexagonal bar 11a by means of screw 14a, thereby ensuring a very strong mechanical and electrical connection. This condition is also true to the connections of connectors 12b and 12c to their respective hexagonal bars 11b and 11c.

Figure 3 illustrates a preferred connection of plates to the corresponding terminal lugs. Steel plate 15a is electrically connected to terminal lug 9a through connector 12a as this plate is held through the hole at its smaller portion by two nuts 13 located on a threaded portion of connector 12a. Steel plates 15b and 15c are electrically connected to terminal lug 9b through connector 12b as these two plates are held through the holes at their smaller portion by four nuts 13 located at the threaded portion of connector 12b. The same arrangement is used for the remaining three plates 15d, 15e and 15f. Terminal lugs 9a and 9c are equidistant from terminal lug 9b as shown in Figure 3 of the drawing.

For normal use, an electrical supply of 220 volts with adequate protection is connected across terminal lugs 9a and 9b. With such a connection it will be observed that upon closing of a switch (not shown) a voltage is established between plate 15a

and plates 15b and 15c, and the water flowing between these plates is heated as it serves as the load of the electrical 60 circuit.

The temperature of the water may be raised, if desired, by connecting terminal lugs 9a and 9c across the electrical supply. The water may be raised to an even higher 65 temperature by connecting terminal lug 9b and terminal lug 9c across the line. The temperature of water may also be varied mechanically, that is by controlling the rate of flow of water by means of the inlet 70 valve which is installed before the inlet of the heater.

The number and/or size of the electrodes is chosen to suit the electrical conductivity of the water which acts as the resistance. 75

#### WHAT I CLAIM IS:—

1. Water heating apparatus which includes a container having a centrally located lower inlet and an upper outlet so that water can be caused to flow upwardly 80 through the container from its inlet to its outlet, and a number of spaced parallel electrodes extending downwardly into the container so that when selected electrodes are connected to an electrical supply the 85 water flowing between the selected electrodes serves as a load for the electrical circuit, thereby heating the water, wherein the electrodes are in the form of spaced parallel plates and the electrodes are 90 secured together by means of a bolt passing horizontally through the electrodes and being electrically insulated from all of them.

2. Apparatus as claimed in claim 1, 95 wherein the container is of cylindrical form arranged with its axis disposed vertically, the inlet being provided in the closed lower end of the container and the electrodes being suspended from a cover fitted to the 100 upper end of the container.

3. Apparatus as claimed in claim 2, wherein each electrode is supported by means of an electrical connector connected between the upper end of the electrode and 105 a hexagonal bar passing through the cover, a terminal being provided on the upper end of the bar.

4. Water heating apparatus substantially as described with reference to the accompanying drawings.

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